

Environmental Systems Management, Analysis, and Reporting NeTwork (E-SMART)

A Cooperative Development Program through the Defense Advanced Research Projects Agency (DARPA)
Technology Reinvestment Project

THE PROBLEM:

Monitoring contaminated sites and point sources using current sampling and analysis techniques is labor intensive and costly. More than half of DOD contaminated sites will require long-term monitoring during and after remediation. Using today's methods, the cost of monitoring could exceed the cost of remediation.

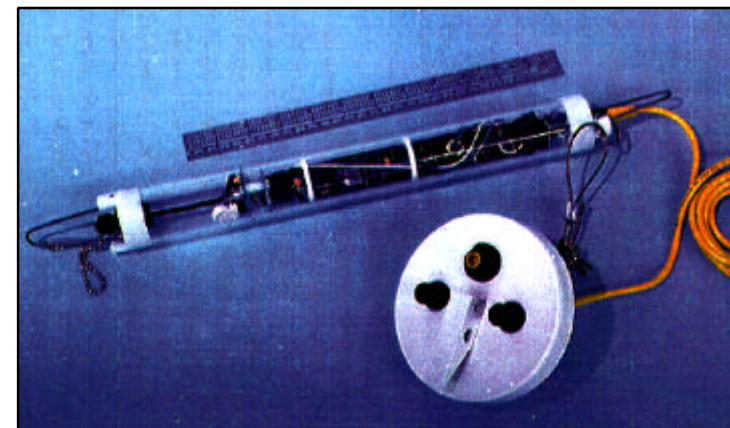
THE SOLUTION:

E-SMART integrates advancements in *in situ* sensor technology with proven communication, electronic control and analysis technology to produce a reliable, versatile, intelligent, and cost-effective environmental monitoring system.

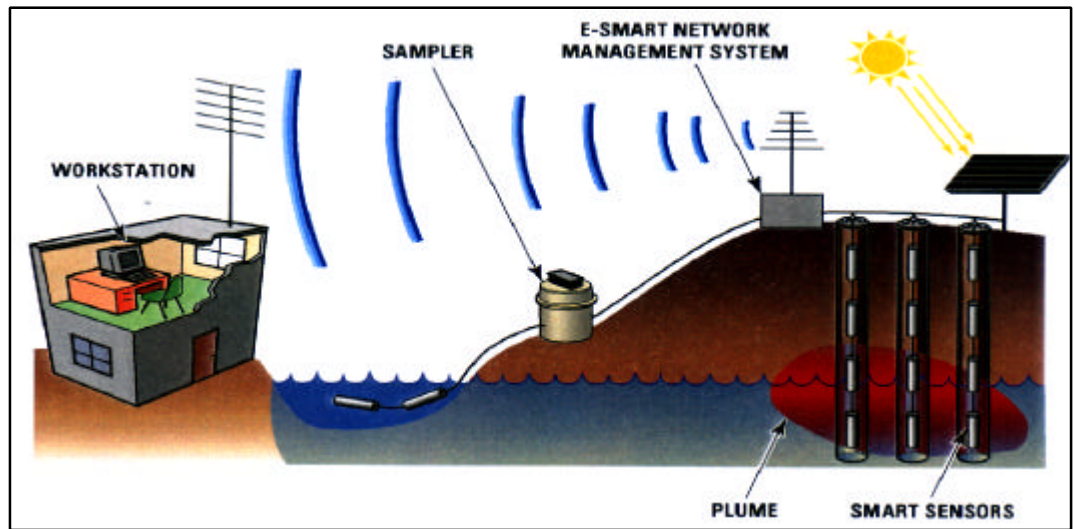
E-SMART establishes standardized open-network protocols for sensors, sampling systems, and graphical user interfaces for data evaluation and visualization.

THE PLAYERS:

The Air Force Research Laboratory, Materials and Manufacturing Directorate, Airbase and Environmental Technology Division (AFRL/MLQ) initiated and is participating in a General Atomics-led team. The team also includes Isco, Inc., Photonic Sensor Systems, Georgia Tech Research Institute, Science & Engineering Analysis Corporation, Sawtek, and Perkin-Elmer. Development is continuing under a DARPA Technology Reinvestment Project (TRP). AFRL/MLQ provided input on the E-SMART system requirements for the Air Force and identified dual-use applications.



Down-Well Sensor Module and Well Cap Interface



SENSORS:

E-SMART allows the use of off-the-shelf commercial samplers and sensors, as well as a new class of smart, highly sensitive, chemically specific, *in situ*, multichannel microsensors using integrated optical interferometry technology. The smart sensors are designed to achieve enhanced speciation discrimination and sensitivity. Standardized protocols permit easy integration of new sensors as they become available.

DEMONSTRATION:

A phased field demonstration of E-SMART is being conducted at Tinker AFB, OK. Network installation began September 1996. Initial testing demonstrated commercial barometric pressure, oxygen, water level, and volatile organic compound (VOC) sensor integration on the network. The second phase added the specialized smart sensors, followed by the third phase to optimize and validate the system. E-SMART system development/operation continues under direction of Oklahoma City Air Logistics Center, Environmental Management.

APPLICATIONS:

- ✓ **Remediation** -- CERCLA and Pump-and-Treat
- ✓ **Compliance** -- RCRA
 - Clean Water Act (CWA) and National Pollution Discharge Elimination System (NPDES)
 - Clean Air Act Amendments (CAAA)
- ✓ **Pollution Prevention** -- Minimize waste or off-specification production through process control

E-SMART decreases operations and maintenance costs. It automates the entire monitoring, data management, and reporting process by providing process control and a rapid return on investment.

**FOR MORE
INFORMATION
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